THAT WHICH IS CLAIMED IS:

1. A reflector antenna system comprising:

at least one antenna reflector having an arcuate shape and defining an antenna beam; and

a phased array antenna positioned in the antenna beam and comprising

a substrate,

a plurality of back-to-back pairs of first antenna elements carried by said substrate and configured for defining at least one feed-through zone for the antenna beam, and

a plurality of second antenna elements carried by said substrate and defining at least one active zone for the antenna beam.

2. The reflector antenna system of Claim 1 further comprising a transmitter connected to said second antenna elements.

3. The reflector antenna system of Claim 1 further comprising a receiver connected to said second antenna elements.

4. The reflector antenna system of Claim 1 wherein said phased array antenna further comprises a controller for configuring said back-to-back pairs of first antenna elements to define the at least one feed-through zone.

5. The reflector antenna system of Claim 4 wherein said phased array antenna further comprises a respective phase shifter connected between each pair of back-to-back first antenna elements, and wherein said controller controls a phase of said phase shifters.

6. The reflector antenna system of Claim 4 wherein said phased array antenna further comprises a respective gain element connected between each pair of back-to-back first antenna elements, and wherein said controller controls a gain of said gain elements.

7. The reflector antenna system of Claim 1 wherein each of said first and second antenna elements comprises a dipole antenna element comprising a medial feed portion and a pair of legs extending outwardly therefrom, and wherein adjacent legs of adjacent dipole antenna elements include respective spaced apart end portions.

8. The reflector antenna system of Claim 7 wherein the spaced apart end portions have predetermined shapes and relative positioning to provide increased capacitive coupling between said adjacent dipole antenna elements.

9. The reflector antenna system of Claim 7 further comprising a respective impedance element electrically connected between the spaced apart end portions of adjacent legs of adjacent dipole antenna elements.

10. The reflector antenna system of Claim 9 wherein each respective impedance element comprises at least one of an inductor and a capacitor.

11. A reflector antenna system comprising:

at least one antenna reflector having an arcuate shape and defining an antenna beam; and

a phased array antenna positioned in the antenna beam and comprising

a substrate,

a plurality of back-to-back pairs of first antenna elements carried by said substrate and configured for defining at least one feed-through zone for the antenna beam,

a plurality of second antenna elements carried by said substrate and defining at least one active zone for the antenna beam, and

a transceiver connected to said second antenna elements.

12. The reflector antenna system of Claim 11 wherein said phased array antenna further comprises a controller for configuring said back-to-back pairs of first antenna elements to define the at least one feed-through zone.

13. The reflector antenna system of Claim 12 wherein said phased array antenna further comprises a respective phase shifter connected between each pair of

back-to-back first antenna elements, and wherein said controller controls a phase of said phase shifters.

14. The reflector antenna system of Claim 12 wherein said phased array antenna further comprises a respective gain element connected between each pair of back-to-back first antenna elements, and wherein said controller controls a gain of said gain elements.

15. The reflector antenna system of Claim 11 wherein each of said first and second antenna elements comprises a dipole antenna element comprising a medial feed portion and a pair of legs extending outwardly therefrom, and wherein adjacent legs of adjacent dipole antenna elements include respective spaced apart end portions.

16. A reflector antenna system comprising:

at least one antenna reflector having an arcuate shape and defining an antenna beam; and

a phased array antenna positioned in the antenna beam and comprising a substrate and a plurality of back-to-back pairs of antenna elements carried by said substrate and configured for defining at least one feed-through zone for the antenna beam.

17. The reflector antenna system of Claim 16 wherein said phased array antenna further comprises a controller for configuring said back-to-back pairs of antenna elements to define the at least one feed-through zone.

18. The reflector antenna system of Claim 17 wherein said phased array antenna further comprises a respective phase shifter connected between each pair of back-to-back antenna elements, and wherein said controller controls a phase of said phase shifters.

19. The reflector antenna system of Claim 17 wherein said phased array antenna further comprises a respective gain element connected between each pair of back-to-back antenna elements, and wherein said controller controls a gain of said gain elements.

20. The reflector antenna system of Claim 16 wherein each of said antenna elements comprises a dipole antenna element comprising a medial feed portion and a pair of legs extending outwardly therefrom, and wherein adjacent legs of adjacent dipole antenna elements include respective spaced apart end portions.

21. A method for using a phased array antenna comprising a substrate, a plurality of back-to-back pairs of first antenna elements carried by the substrate, and a plurality of second antenna elements carried by the substrate, the method comprising:

positioning the phased array antenna in an antenna beam defined by at least one antenna reflector having an arcuate shape; and

configuring the back-to-back pairs of first antenna elements to define at least one feed-through zone for the antenna beam, and configuring the second antenna

elements to define at least one active zone for the antenna beam.

22. The method of Claim 21 further comprising transmitting a feed from the second antenna elements.

23. The method of Claim 21 further comprising receiving the antenna beam using the second antenna elements.

24. The method of Claim 21 wherein the phased array antenna further comprises a respective phase shifter connected between each pair of back-to-back first antenna elements; and further comprising controlling a phase of the phase shifters.

25. The method of Claim 21 wherein the phased array antenna further comprises a respective gain element connected between each pair of back-to-back first antenna elements, and further comprising controlling a gain of the gain elements.

26. The method of Claim 21 wherein each of the first and second antenna elements comprises a dipole antenna element comprising a medial feed portion and a pair of legs extending outwardly therefrom, and wherein adjacent legs of adjacent dipole antenna elements include respective spaced apart end portions.